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Chapter 22

COOPERATIVE AND NON-COOPERATIVE BEHAVIOR IN PAIRS OF CHILDREN: THE RECIPROCAL EFFECTS OF SOCIAL INTERACTION IN THE ONGOING CONSTRUCTION OF A PLAY SEQUENCE

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ABSTRACT

We know that some social interactions begin and end cooperatively, while others start aggressively and end up even more so.

We also know that in some social interactions one of the partners might initially behave either cooperatively or competitively and aggressively towards the other partner, who may respond with the opposite type of behavior. However, over time, as the relationship evolves, behavioral patterns may change as each partner adapts to the behavior of the other.

We think that as social interactions evolve over time, it is possible to identify two phases: first, a reciprocal exploration phase, and second, an adjustment phase. Investigating very short term social interaction sequences of about ten minutes, we concluded that these two phases last about five minutes each.

The present study investigates the relationships between cooperative and non-cooperative or competitive behavior in pairs of children in the ongoing process of interaction during a ten-minute play sequence. To reach our goal, we first divided the time of the play sequence (10') in two phases and looked at the differences between the first and second phase (5' each). Second, we divided the pairs of children in three groups: i) initially high in cooperation; ii) initially high in competition; iii) initially high in both. Third, we looked at the outcomes using both linear and logistic regression analyses. We hypothesised that: a) initially prevalent cooperative behavior is more likely to end in cooperation; b) initially prevalent competitive behavior is more likely to end in

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competition; c) initially mixed social interactions (both cooperative and competitive) are more likely to end in abandonment of the interaction and doing nothing.

Our sample is composed of 125 pairs of children. 69% (N=86) of the pairs were composed of same-sex children, while the remaining 31% (N=39) were mixed. The individuals within each pair were the same age. 35% of the pairs (N =44) were eight years old, 38% (N =48) were ten years old, and 27% (N=33) were twelve years old. We observed the cooperative and competitive behavior of both the partners. The task was to finish a puzzle in ten minutes.

Our findings confirmed only our first two hypotheses. We found that initially mixed situations were also more likely to end in cooperation. These findings underline the importance of intervention programs aimed at promoting social and cooperative skills in children to avoid starting negative social cycles or patterns.

INTRODUCTION

Peer Relationships

It is now widely acknowledged that peer relationships can promote an individual's cognitive, affective, and social development. However, how and why this happens is still a topic of discussion in current developmental psychology [Bukowski, Newcom & Hartup, 1996; Fonzi, 1996; Rubin, Bukowski & Parker, 2006].

In fact, despite their high social and psychological relevance we do not know much about the processes that lead children to choose different interactive strategies and to learn to modulate their behavior with respect to their peers [Pepitone, 1980; Fonzi, 2003]. The relevance of a deeper understanding of children's social relationships with peers has its roots in the fact that human beings are intrinsically social, or in other words, they are biologically built to live with other people and to face the challenges of living in a group. As we know, the social interactive strategies used by people are not always adaptive, but we still lack knowledge about the underlying processes that lead us to more or less successful social interactions.

One important reason for this lack of knowledge is that, in developmental psychology, the importance of peer relationships for individual development emerged only recently. More precisely, it emerged only after we had abandoned the traditional idea, promoted by both Piaget and Freud [Rutter & Rutter, 1993], of development that goes from the individual to the social level, and after we had acknowledged the precocious and complex social competence of children [Schafer, 2004].

The idea that the child begins life as an essentially asocial and egocentric being and that through socialization he/she is able to establish successful social relationships has been surpassed. Rather, we now believe that the child, who is active in establishing social relationships from the very beginning, enters progressively into wider social networks.

We also know that people construct relationships based on personal goals, cognitive skills, and social demands. Thus, every change in a relationship can be considered both the result of ongoing social processes and a factor that can promote further cognitive and social development [Laursen & Bukowski, 1997]. On one hand, relationships with significant others, including those between a child and their peers, reflect the psychological needs of the participants. On the other hand, these relationships contribute to the construction, particularly

during childhood, of the patterns and prototypes of future relationships [Bowlby, 1988; Hazan & Shaker, 1987].

Furthermore, it is known that greater social cognition, in terms of both cognitive capabilities and perspective-taking skills, facilitates a better understanding of relational dynamics [Selman, 1980; Youniss, 1980; Dunn & Plomin, 1990].

Finally, we are aware that that wider social experiences and opportunities contribute to increasing personal interest in social exchanges and attention to their quality and equity [Kelley & Thibaut, 1978; Laursen & Bukowski, 1997].

Vygotskij's historical-cultural model strongly contributed to this change in perspective. In fact, Vygotskij [1978] stated that all psychological functions are first inter-psychic, or rather they begin within a social relationship, and only later become intra-psychic, meaning that they belong to the individual. According to this theoretical model, social contexts, including peer relationships, have a structuring role in development. The constructivist paradigm incorporated and extended these issues with the neo-Piagetian scholars [Doise & Mugny, 1981; Mugny & Carugati, 1987; Doise, Deschamps & Mugny, 1991]. Social interaction became the basic component for acquiring and building new capabilities, based on the ideas that a child is able to assess the ineffectiveness of his/her thoughts and that he/she can achieve more advanced thinking through social comparison with peers. Cognitive development consists of a "social building of intelligence" and inter-individual conflict - in other words socio-cognitive conflict - fulfils a propulsive role. This conflict, which originates in social interactions as a result of different ways of thinking, produces an imbalance that is useful in gaining an awareness of perspectives other than one's own.

Acknowledging the precocious social competence of children represented a further crucial contribution. Some ecological studies carried out in children's life contexts - at home and in kindergarten - underlined that children, from infancy, are active subjects with cognitive, behavioral, and emotional competencies, and that they are able to actively interact with adults and peers [Schneider, 2000]. Social competence is the skill of attaining personal goals within social interaction and of maintaining positive relationships under different circumstances [Rubin, Bukowski & Parker, 2006]. We consider social competence as the result of a compromise between the need for self-realization and social adjustment and as the expression of the "self-other" dualism of each individual within a social and interpersonal context [Röhrle & Sommer, 1994; Rubin, Bukowski & Parker, 2006].

Very early on, children are capable of actively participating in social interactions with peers [Hartup, 1979, 1989; Dunn, 2004]. With time, children build more complex social relationships, such as friendships [Fonzi, 1996; Bombi, 2000; Bukowski, Newcomb & Hartup, 1996]. Observational research conducted in kindergartens [Verba, Stambak & Sinclair, 1982; Bonica, 1983, 1989, 1990; Verba, 1993; Bonica *in press*] underlined the complexity and vitality of peer interactions. As opposed to what scholars had previously hypothesised, this research showed the parallel development of interest by children in both physical objects and peers. Other research carried out in the family context [see: Dunn, 1988; Baumgartner & Tallandini, 2002] highlighted that during the third year of life, children are able to understand even complex emotional states experienced by others and to build a representation, although partial, of their own and other people's mental states. Finally, from an early age, children demonstrate altruistic behavior, such as soothing a crying playmate or offering him/her one's own favourite toy [Pines, 1980].

The progressive increase in knowledge about different features of children's social lives has lead scholars to go well beyond the idea of a substantially aggressive and egocentric child. Children are able to consider the intentions and wishes of other people and to help and comfort them at a much earlier age than Piaget had hypothesised. Rather than being centred only on him/herself, the child has the ability, although partial, to decentralize from him/herself and open up to other people. Therefore, children are clearly characterized by a very precocious and complex social competence [Dunn, 1988].

This new perspective has encouraged scholars to analyse the characteristics of children's interactive strategies and, more specifically, to examine the factors and circumstances that promote the use of positive sociability strategies, such as altruistic and pro-social behavior and cooperation [Pepitone, 1980].

Cooperation

Cooperation is a type of social interaction characterised by specific features. It requires the presence and the definition of a common goal among all the participants in the interaction, with each participant behaving in order to reach this common goal. This is opposed to altruistic or pro-social behavior in which one participant works for the benefit of the other, and to competition, in which the participants work against one another. Moreover, cooperation requires the coordination of individuals' actions through planning in pairs or groups. Individuals' contributions must be complementary and the partners must assume correlated roles.

The ability to coordinate one's actions with the actions of others means that everyone achieves his/her goal while gaining the perspective of the others in the group. Verbal communication between people engaged in a common effort may facilitate coordination even of different personal perspectives. Finally, a cooperative social interaction is characterized by a positive or at least neutral affective tone among the participants.

During childhood, cooperation has a positive influence and plays a crucial role particularly in cognitive development [Smith & Craig 2002]. Cooperation with peers is essential for learning [Perret-Clermont, 1979]. The effort of sharing a goal with a partner requires a child not simply to adapt to the ideas and competencies of other people, but rather to work out a solution that considers the needs of all those involved. Cooperation may also strengthen the ability to work with others and view situations from other perspectives. As a circular process, the social capabilities the child acquires through cooperation can further promote his/her social development and adjustment.

Competition differs from cooperation essentially with respect to the nature of its aim: participants act with only their own interests in mind, working against the other participants. However, although cooperation and competition lie at opposite ends of the *continuum* of human social strategies [Fonzi, 2003] they are not actually opposing realities since cooperation does not consist only of positive aspects and competition does not include only negative ones. In fact, sharing a common aim with other individuals using a cooperative strategy does not imply this aim is intrinsically positive. In the same way, competition does not necessarily imply overpowering other people. Additionally, the social comparison aspect of competition can be useful in the development and integration of one's system of knowledge about oneself, others, and reality, as well as offering an opportunity to experiment

with one's own abilities. Competition may assume a positive role when it does not involve fighting against others, but rather fighting against the constraints imposed by reality and against one's own limits. Competition may also contribute to self-realization and the development of personal capabilities and it may teach us how to confront frustrating situations. However, competition can carry out this positive role only when social comparison is characterized by both appreciation of the others involved and respect for social rules. Conversely, competition is maladaptive when the limit to exceed is represented by other people, when one is unable to consider the equal rights of others to be appreciated and gain self-realization, and when one is willing to use any means to achieve success.

Peer relationships are privileged scenarios for cooperative strategies, particularly when children have full responsibility for the interaction. The assumption of personal responsibility by the children promotes their active role in managing interpersonal dynamics, such as seeking negotiation strategies and defining a goal that satisfies all the participants.

Furthermore, we know that different factors, such as individual or contextual characteristics, may alternatively promote the use of cooperative strategies by children, or interfere with their use.

In general, a distinction can be made between internal factors, like cognitive and affective factors, and external factors, such as social and situational factors. However, it is always necessary to bear in mind that these factors constantly interact with one another during the ongoing course of a social interaction in ways that we only partially understand.

Cognitive, Affective, and Social Factors that Can Promote Cooperation

We know that there is a strong link between cognitive factors, such as thinking, and cooperative interactive social strategies. Thinking allows people to find a variety of solutions to the same problem. Furthermore, thinking allows people to distance themselves from reality on an emotional level as well. The ability to look beyond the reality of the present situation and come up with new solutions that take into account the needs of different people is precisely what cooperation requires.

Recent studies have also demonstrated a strong relationship between cooperation and the capacity for inhibitory control, which is associated with the executive functions of the frontal and pre-frontal cortex [Nigg, Quamma, Greenberg & Kusché, 1999; Decety, Jackson, Sommerville, Chaminade & Meltzoff, 2004]. Inhibitory control, as it relates to flexibility in thinking, is the capacity to go beyond previously acquired or automatic responses and to modify one's own behavior when faced with changing situations. Some of our research showed a positive relationship between flexible thinking and competence in cooperation during childhood and early adolescence. In their social interactions with peers, children with high flexibility in thinking use more cooperative, less competitive, and less neutral social strategies than children with low flexibility. Flexibility in thinking seems to facilitate the re-construction of the current situation by imagining alternative solutions and overcoming more rigid, narrow perspectives [Ciairano, Bonino & Miceli, 2006]. Furthermore, flexibility in thinking also seems to have some long-term effects on the cooperation of children and early adolescents [Ciairano, Petra & Settanni, 2007].

However, the capacity to decentralise from the current situation and the ability to view the situation from other perspectives than one's own are necessary but not sufficient in order

to behave cooperatively. In fact, these same capabilities are also required when competing. Cooperation, however, is also influenced by affective and social factors.

Cooperation requires the capacity to find a balance between the internal and external world, balancing the need for self-realization with the need for social bonds. We know that some emotional factors in particular may lead to more primitive, less adaptive strategies like aggression, or to more advanced, adaptive strategies, such as cooperation. For instance a negative emotional condition, such as the perception of powerlessness due to a specific danger or to general uncertainty, is more likely to lead to aggression than to cooperation. When levels of stress, fear, or anxiety are very high, the appearance of primitive, immature, and/or insufficiently structured actions becomes more probable. Conversely, positive emotional conditions, such as a feeling of security and mastery, may promote the use of more advanced and adaptive conduct, like cooperation.

Some situational factors can also carry out a crucial role in modulating cooperation in children. Among these factors, we know that the availability of physical and psychological resources, fair distribution of benefits and rewards for personal and collective performance, and impartial social comparison can promote cooperation. Conversely, lack of resources and unequal distribution of benefits can contribute to the creation of a highly competitive climate [Tassi, 2002; Richard, Fonzi, Tani, Tassi, Tomada & Schneider, 2002].

Social comparison is relevant in the definition of individual capacity. Bandura [1997] showed a link between social comparison and self-efficacy. Self-efficacy emerges both by testing one's own capacity to achieve certain tasks, and by having adequate ability levels with respect to those of the other people. On the one hand, social comparison can promote a competitive climate. On the other, the comparison between one's own performance in a task and the performance of others can promote cooperative solutions when the context values intrinsic motivation, such as developing new competencies or improving personal performance, instead of extrinsic motivation.

Intrinsic motives, along with the certainty that all participants will have a turn to be successful, represent positive experiences for children.

Among the social factors that can promote cooperation in children, we must also consider the educational style of their parents and teachers, how strict or rigid they are, and the way these adults typically intervene in children's peer relationships [Bonino, 2003; Fonzi & Tassi, 2003]. These factors can operate directly, fostering children's social development by rewarding some behaviors and punishing others. However, the same social factors can also operate indirectly by promoting feelings of self-confidence or, conversely, lack of self-confidence. Furthermore, adults' educational styles can also affect the cognitive processes of children by promoting, more or less effectively, the capacity to decentralise from their personal perspective, and the ability to seek adaptive social responses that are cognitively mediated and less primitive, as opposed to aggression.

On these theoretical bases, a cooperative form of learning has been extensively introduced in the schools. Cooperative learning originated from the construct of democratic education, introduced by Dewey [1916], and is also meant to promote progress in social life. This educational model is based on peer exchange and the process of "co-construction" of ideas, which derives from this exchange [Sullivan, 1953; Youniss, 1980]. In a collaborative context where equality is valued, children can gain new knowledge together and can validate cognitive strategies consensually. Children can learn by thinking and creating projects alongside their peers, which require common effort and commitment. Within these

relationships children can also experience collaboration and cooperation as modalities of social interaction: ideas are discovered together, within a cooperative climate, where everyone can use the ideas of his/her classmates to complete one's own thinking [Slavin, 1983; Johnson & Johnson, 1987].

THE PRESENT STUDY

Considering the importance of cooperation and its deep roots in human nature, what is the contribution of the initial phase of the interaction (the partner may start behaving more or less cooperatively or competitively) in forming either a positive cycle of cooperation or, conversely, a vicious cycle of competition during children's social interactions?

Very few, if any, studies have investigated this aspect from a psychological point of view. We found only some economic and social-biological research on the topic. According to mathematicians and economists, cooperation is a convenient social strategy only if all the participants cooperate [to see Game Theory: Fudenberg & Tirole, 1991; Myerson, 1991]. Otherwise, the risk of losing rather than gaining is too high and the individual is more likely to select different strategies.

According to social-biologists [to see Alcock, 1975, 2001; Freeman, 2002], cooperation (although in social-biology cooperation is often considered synonymous with altruism or pro-social behavior) is convenient only when we can gain an indirect advantage for our goodness of fit, in terms of increasing the probability of the survival of our genes. This can explain why animals are more willing to help individuals who share part of their genetic inheritance.

In our opinion, these two perspectives are too narrow to be applied to cooperation between children. Furthermore, they do not help us to understand the underlying processes of social interaction. We also feel that there are probably great advantages to cooperating with somebody who appears likely to cooperate. Furthermore, it is not unlikely that children think it is more appropriate to act competitively when the partner also uses competition. However, these two perspectives do not help us to disentangle what happens when social interaction consists of both cooperative and competitive strategies. It seems plausible that under these particular conditions, the social interaction may end with the participants leaving the interactive field, for instance doing nothing, as suggested by the Theory of Learned Inactivity or Learned Helplessness (Peterson, Maier & Seligman, 1993; Overmier, 2002). However, the intrinsic social nature of human beings cannot be disregarded and different solutions are certainly possible.

The present study investigated the relationships between cooperative and non-cooperative or competitive behavior in pairs of children in the ongoing process of interaction during a play sequence of ten minutes. We know that some social interactions both begin and end cooperatively. Other interactions start aggressively and end even more aggressively.

In some social interactions one of the partners may initially behave either cooperatively or competitively and aggressively towards the other partner, who may respond with the opposite type of behavior.

However, as the relationship evolves, something may change in the behavioral patterns because each partner may adapt to the behavior of the other and we are interested in discovering more about this phenomenon.

More precisely this study is aimed at answering the following three research questions:

1. Are pairs who are cooperative at the beginning of the play sequence more likely to be cooperative in the second phase of play as well?
2. Are pairs who are non-cooperative or competitive in the beginning of the play sequence more likely to show non-cooperative behaviors in the second phase of play as well?
3. How do children who began the sequence with both cooperative and competitive behaviors behave in the second phase of play?

We hypothesised that: a) initially prevalent cooperative behavior is more likely to end in cooperation; b) initially prevalent competitive behavior is more likely to end in competition; c) initially mixed social interactions (both cooperative and competitive) are more likely to end in abandonment of the task, doing nothing.

Participants

This study is part of wider project about cooperation in childhood [see also Ciairano, et al., 2007]. In this paper, we will consider only the second wave of this wider project.

125 couples of children participated at the study. The 69% (N=86) was same-sex couples (38%, N=47 only boys; 31%, N=39 only girls), while the remaining 31% (N=39) consisted of mixed couples. With regard to the age, the individuals within each couple shared the same age. Specifically, the 35% (N of couples=44) was eight year old, the 38% (N of couples=48) was ten year old, and the 27% (N of couples=33) was twelve year old.

All the parents of the children gave informed consent for their children's participation, in accordance with the Italian law and the ethical code of the Association of Italian Psychologists. All the instruments were administered in the school by trained researchers and teachers were not present during the examination procedure. Finally, no incentive was used to recruit participants.

Procedure

Within each classroom, children were paired randomly (extracting their names). As consequence of that, the formed couples were either homogeneous (69%, N=86) or heterogeneous (31%, N=39) with regard to the gender. The randomization of individuals within classroom instead of within school was due to the fact that it was the only possible strategy accepted by the principals. Indeed, we were not allowed to mix people from different classroom groups. Finally, this is also why the couples were homogeneous as far as age concerned.

They were asked to build a puzzle together. They had ten minutes to do so. During this time, they were observed by a researcher (blind to the purpose of the study), who coded their actions as cooperative, non cooperative o competitive, and neutral. For this purpose a structured checklist was built up. The checklist contained the temporal information in the columns, whereas the rows identified the behavioral categories [see for more details,

Ciairano, Bonino, & Miceli, 2006]. It was not possible to find a high number of schools that easily allowed for filming children while playing. As consequence, no objective measure of inter-rather reliability was available for the whole area of observation. However, we managed to film the execution of the puzzle task in a school. The videos, representing the 20% of the total number of observations were coded by two independent observers (blind to the scope of the study). So that, we can calculate a percentage of consensus, which was very high (95%).

Measures

Cooperation: The Puzzle Task

To measure the degree of cooperation among children, we proposed a task near as much as possible their normal life: play with a puzzle. This task permitted us to observe the children's behavior in a natural context, such as school, and at the same time in a quite structured situation.

Within the same class group, couples were formed randomly and they were invited to play with a puzzle. The number of puzzle pieces was different according to the age of participants: 49 pieces for eight years old children; 60 pieces for ten years old children; 70 pieces for eleven years old children. The researcher presented two different puzzles for each pair, asking to choose what they preferred to build up. After the choice, the researcher gave the following instruction: "Now, you have to try to finish the puzzle together. You will have ten minutes". After that, the observation started.

We observed both verbal and non-verbal cooperative behavior. However, in this study we will focus only on the non-verbal cooperative actions, excluding the verbal ones. To categorize cooperative actions, we used a comprehensive checklist, based on a preliminary pilot study. The categories we used were: 1) cooperative actions – behavior directed towards reaching a common goal with the partner (e.g. showing a piece, offering a piece, accepting a piece); 2) non-cooperative or competitive – behavior directed explicitly against reaching a common goal with the partner (e.g. removing the piece of the puzzle that the partner has just built); 3) neutral – behavior involving neither attempts to share with the partner nor fighting against him/her (e.g. solitary play, watching the other child playing).

An observer (blind to the motive of the study) coded every minute the number of actions as cooperative, non cooperative, and neutral, using a checklist. So doing, we got 10 indicators of cooperative, non cooperative or competitive, and neutral actions within a minute. For the purpose of this study the neutral actions were not used.

Measures

A Typology of Cooperative Behavior

Using the score of cooperative and non cooperative actions in the first phase of the play, we built up a typology of cooperative behavior for describing the behavior of the couple. First of all, we summed up the amount of cooperative behavior of each individual within a couple. So doing, we obtained a score of cooperative behavior of the couple within each minute. Then, the scores of the first five minutes of observations were summed up. We adopted a

similar procedure for non cooperative behavior. Moreover, the same modus operandi was used for the scores of the second five minutes of observations. Afterward, each couple was classified as high (from half standard deviation above the average to the maximum), low (from the minimum to half standard deviation below the average), or intermediate (in the middle, that is from values greater than half standard deviation below the average and values lower than half standard deviation above the average) with respect to both cooperative and non cooperative or competitive actions. Then, we created a typology that took together these informations about cooperative and non cooperative actions in the first five minutes of playing. We called "*non cooperative*" couples those ones who had many non cooperative actions and few or average cooperative actions. "*Cooperative couples*" were those who had high levels of cooperative behavior and low or average levels of non cooperative behavior. "*Mixed couples*" had high or average levels of both cooperative and non cooperative behavior. Finally, "*no behavior*" couples were low both in cooperative and non cooperative behavior. Finally, we built up the same typology for the observations of the last fifth minutes of the play.

Analyses

To explore whether cooperative couples at the beginning of the play (T1) were more likely to show cooperative behavior in the second phase of the play (T2) and whether non cooperative couples were more likely to show non cooperative behavior, we performed a MANOVA. The typology of prevalent behavior at T1 was entered as independent variable, while the couple's score of cooperative and non cooperative behavior at T2 were entered as dependent variables. So doing, we explored whether the amount of cooperative behavior at T2 was higher in the couples that showed cooperative behavior at T1, and vice versa, whether the amount of non cooperative behavior at T2 was higher in non cooperative couples at T1.

With regard to the third research question, we dichotomised the typology regarding the first phase of the play. Mixed couple at the beginning of the play were coded as 1, while the remaining couples were coded as 0. We also dichotomised the typology regarding the second phase of the play. "*No behavior*" couples were coded as 1, while the remaining couples were coded as 0. Then, we performed a logistic regression. We entered, as dependent, the dichotomous variable of people who gave up playing at T2, while the amount of cooperative and non cooperative behavior, and the dichotomous variables of mixed couples at T1 were entered as independent. So doing, we were able to say whether the condition of being a mixed couple at the beginning of the play influenced to being in the *"no behavior*" condition at the end of the play.

RESULTS

Descriptive Information

With regard to the amount of cooperative behavior in the couple, in general the percentage seemed to decrease in the second part of the play (T1: M=16.28, sd=13.42, T2: 21.32, sd=16.49; t=5.3, p<.00).

On the contrary, percentage of non cooperative behavior remained stable in both times (T1: M=14.58, sd=8.13; T2: M=13.91, sd=10.37; t=1.36, n.s.).

In the typology of behavior at T1, we found out 39 *non cooperative* couples (31%) at T1, 37 *cooperative* couples (30%), 20 *mixed* couples (16%), 29 *no behavior* couples (23%).

Table 1. Mean and standard deviation of amount of children' cooperative and non cooperative behaviour at T2 by typology of behaviour at T1 (MANOVA)

Group	Cooperative behaviour T2 M (SD)	Non cooperative behaviour T2 M (SD)	Sample N
Typology at T1			
Cooperative	38.83[a] (14.81)	3.32[a] (4.14)	37
Non cooperative	9.87[b] (6.97)	24.23[b] (8.01)	39
Mixed	19.55[c] (12.73)	13.95[c] (5.81)	20
No behaviour	15.58[bc] (11.04)	13.51[c] (6.92)	29

* Same letter means equal means

Table 2. Logistic regressions, predictors of being classified a *no behaviour* couple at T2

Predictors	No behaviour couple T2		
	B coefficient	Standard Error	Exp(B)
Cooperative behaviour T1	-.08*	.03	.92
Non cooperative behaviour T1	-.15*	.05	.86
Being classified a mixed couple at T1	.41	.59	1.65

* p<.05

Table 3. Logistic regressions, predictors of being classified a mixed couple at T2

Predictors	Mixed couple T2		
	B coefficient	Standard Error	Exp(B)
Cooperative behaviour T1	-.10*	.037	.90
Non cooperative behaviour T1	-.12*	.056	.88
Being classified a mixed couple at T1	.48	.59	1.61

* p<.05.

No differences by gender (couple of girls, couple of boys, mixed couples) were found in the distribution of this typology (Chi square=4.4, n.s.). Finally, no differences by age were found in typology of behaviors at T1 (Chi square=6.6, n.s.). Thus, the distribution of couples into the fourth categories was not related to the gender and the age of the couples.

Cooperative and non Cooperative Couples at T1

A MANOVA model was used to test the first and the second hypotheses. The multivariate analysis of variance revealed a significant multivariate main effect of the typology on cooperative and non cooperative behaviors at T2 ($F(6, 238)=42.16$, $p<.00$). With respect to univariate tests, as shown in table 1, cooperative couples at T1 scored higher on cooperative behavior at T2 than non cooperative, mixed and no behavior couples at T2 ($F(3,121)=43.42$, $p<.00$). Moreover, non cooperative couples at T1 scored higher on non cooperative behavior at T2 than the others couples ($F(3,121)=66.39$, $p<.00$). Thus, the amount of cooperative behavior at the end of the program was found to be related to how individuals interacted at the beginning of the play: cooperative couples were more likely to remain cooperative, while non cooperative couples were more likely to keep on with non cooperative behaviors.

Table 4. Logistic regressions, predictors of being classified a non cooperative couple at T2

Predictors	Non cooperative couple T2		
	B coefficent	Standard Error	Exp(B)
Cooperative behaviour T1	-.07	.06	.92
Non cooperative behaviour T1	-.29**	.08	.86
Being classified a mixed couple at T1	.59	.75	1.80

* p<.05
** p<.01

Table 5. Logistic regressions, predictors of being classified a cooperative couple at T2

Predictors	Cooperative couple T2		
	B coefficent	Standard Error	Exp(B)
Cooperative behaviour T1	.14*	.04	1.15
Non cooperative behaviour T1	-.20+	.10	.81
Being classified a mixed couple at T1	1.35+	.84	3.86

+ p=.10
* p<.05

Mixed Couples at T1

To test the third hypothesis, we performed a logistic regression model (see table 2). Controlling for the initial levels of cooperative and non cooperative behavior, we found out that being a mixed couple at T1 did not increase the likelihood to be in the *no behaviors* condition at T2 (Exp(B)=1.65, n.s.). Then, we performed three other logistic regressions to explore whether being in the mixed couple at T1 was related to being a cooperative, non cooperative, or a mixed couple at T2, again controlling for the initial levels of cooperative

and non cooperative behaviors (see Tables 3, 4, and 5). We found out that being a mixed couple at T1 did not predict being a non cooperative couple (see table 4, Exp(B)=1.80, n.s.), nor a mixed couple at T2 (see Table3, Exp(B)=1.61, n.s.). However, being a mixed couple at T1 marginally increased the likelihood of being a cooperative couple at T2 (see table 5, Exp(B)=3.86, p=.10). Thus, our hypothesis was not confirmed, couples who showed both non cooperative and cooperative behaviors at T1 were slightly more likely to adopt cooperative behavior at T2.

DISCUSSION AND CONCLUSION

The present study was aimed to investigate the interaction strategies in dyads to reach a common goal. Particularly, we observed the phenomena of cooperative and non cooperative behaviors among children's couples who were assigned the task of building up a puzzle. The couples who started with cooperative behavior since the very beginning showed the highest level of cooperation also at the end of the play. On the contrary, non cooperative couples remained non cooperative also in the second part of the play. Thus, it seemed that the behaviors chosen at the beginning of the interaction remained stable up to the end of the interaction.

Regarding to cooperative actions, we know from literature [Pepitone, 1980] that cooperation is a strategy that promotes sociality. This kind of strategy involves a process of negotiation resulting in shared behaviors. Those behaviors go beyond the individual needs and desires in order to get a common goal. This implies cognitive and social abilities. Indeed, cooperation requires perspective taking [Flavell, 1968; Nelson & Kagan, 1972], the ability to decentralize oneself [Bearison, Dorval, LeBlanc, Sadow & Plesa, 2002], and flexibility of thought [Ciairano et al, 2007]. Given that cooperation is the best strategy for the assigned task, it is reasonable to think that if people are able to cooperate since the beginning, they are likely to keep on this behavior up to the end. This would explain the stability of cooperative behavior during the play.

At the same time, couples who were non cooperative at the beginning remained non cooperative until the end of the play. One may hypothesize that this happened for two reasons. First, both children in the couples did not have adequate levels of the required cognitive and social skills to cooperate. Second, one might hypothesize that other mechanisms related to peer relationship are at work in the stability of competition. Particularly, one should notice that the couples consisted of children from the same classroom. That means that children have already got to know each other. As the assignment in the couples was random, it is also likely that some dyads lacked the minimum level of "attractiveness" [Abecassis, Hartup, Haselager, Scholte & Van Lieshout, 2002; Gifford-Smith & Brownell, 2003], which they need to build a positive relationship. This might explain the presence of non cooperative behavior in the non cooperative couples since the beginning. Thus, the lack of cooperation and the presence of aversive behavior in some couples might be due either to cognitive deficit, or to the kind of previous relationship.

Besides, there are couples who showed both cooperative and non cooperative behavior at the beginning of the play. Unexpected, these couples were likely to end up in the cooperative condition. However, the amount of cooperative behavior in the second phase of the play was

higher in couples of children who were cooperative at the beginning of the play than in mixed couples. Nevertheless, mixed couples at the beginning of the game were likely to increase their level of cooperative behavior and to decrease the non cooperative actions so that they ended up as cooperative in the second phase of the play. Initially, children actively tried different types of strategies. After having experienced both, children turned to cooperation, probably because they recognised that cooperation was the best solution to reach their goal. One might hypothesize that a kind of social cognitive conflict [Mugny & Doise, 1978] occurred in these couples. Children in dyads negotiated and regulated their actions. They moved from an initial phase where they tried to balance and to experiment "individualistic" (non cooperative) and "social" (cooperative) behavior. This kind of experimentation generates a social confrontation [Moscovici, 1976], which on its side leads to raising the consciousness of the other's perspective. Being conscious of the different perspective of the partner is the one of the requirement to start cooperating and it might be responsible of the shift toward cooperation. Thus, after an initial phase of conflict and after having explored different possibilities, children in mixed couples chose the cooperative strategies as the best ones to finish the puzzle. It would have been interesting also to investigate what would happen in the future social interaction of our mixed couples that is whether or not they will start with cooperation the next social interaction.

This study has some limitations though. First of all, it was not possible to establish whether the behavior of one component of the couple influences the behavior of the other. Future studies should investigate the reciprocal effects of both partners of the interaction. Second, as abovementioned, it was not possible to know the kind of relationship of members of the couples before starting the assigned task. The previous relationship between the partners might have influenced the willingness to cooperate. Future research should investigate the result of the puzzle task distinguishing clearly between couples of friends and non friends. This new research might be interesting to know whether the cooperation skills are related to some features of the previous relationship between the partners or whether a willingness to cooperate is there independently from previous relational condition.

However, our study has also some strength. It showed that the human social interactions involve much more than economic immediate gains or genetic advantages. Cooperation is not only the result of a favourable and cooperative starting: it might be also the result of an initial experimentation of different social strategies. Thus, a situation of social and cognitive conflict might be fruitful for the social development and not only for the cognitive development. From an applied perspective, this finding suggests us that mixing up more or less cooperative children in the same group is not detrimental for the cooperative individuals, and rather it may be beneficial for the individuals who are more likely to use aversive social strategies.

Besides, our findings also underlined the negative potential sequence of a non cooperative starting. When the children used only non cooperative strategies at the beginning of the interaction, it seems very unlikely that they change their behavioral pattern along the play. Thus, preventing the starting of these negative social cycles seems very important from an applied perspective. Children can continue with their competition also when the task would suggest them to use cooperation in order to finish the construction of the puzzle.

Summarising, human beings are particular social animals: the fact they can think seems to disentangle kind of preferred social interaction from its gains. Therefore, thinking gives us a lot of advantages. Unfortunately, it gives us also a lot of responsibility in selecting the most

adaptive social strategy and the capacity of assuming this responsibility seems to differ in the individuals at least from childhood and early adolescence.

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